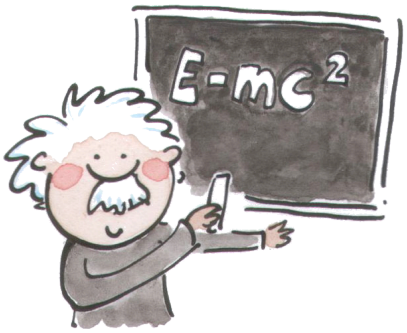
Internal Assessment Cover Sheet

Group 4 (Experimental Sciences)



Student Name

Teacher Name

Title of Investigation

Short Description of Investigation

Level: ☐ **Higher Level** ☐ **Standard Level**

Topic

Time Spent (in hours):

Use of ICT (if applicable)

☐ Data Logging ☐ Graph Plotting Software

☐ Spreadsheet ☐ Database ☐ Computer Model or Simulation

Criteria Assessed

☐ Design

☐ Data collection and Processing

☐ Conclusion and Evaluation

Physics

C R I T E R I A A S S E S S E D

In this practical you will be asked to write a partial/full lab report.

This written report will be assessed against:

☐ **Design** ☐ **Data Collection & Processing** ☐ **Conclusion and Evaluation**

Criteria	**Aspects***	**C**	**P**	**N**
Design	Defining problem and selecting variables			
	Controlling variables			
	Developing a method for the collection of data			

Criteria	**Aspects***	**C**	**P**	**N**
Data collection and processing	Recording raw data			
	Processing raw data			
	Presented processed data			

Criteria	**Aspects***	**C**	**P**	**N**
Conclusion and Evaluation	Conclusion			
	Evaluation			
	Improving the investigation			

* C stands for Completely (2 marks), P stands for Partly (1 mark) and N stands for Not at all (0 marks)

F U R T H E R G U I D A N C E

- For a more detailed of what is expected, look up the 'Checklist IA' on Blackboard or StudyWiz
- Pay attention to units, prefixes, error calculations, significant figures and decimal places
- Return your lab report on the due date in paper form (hardcopy, no email)
- Fill out the cover page and attach this sheet to your report.

LAB REPORT CHECKLIST – Design

Aspect 1: Defining problem and selecting variables

State the research question clearly under the heading "Research question". It should be phrased in the form "how is y dependant on x". If the topic is not obvious it is wise to write a paragraph introducing the topic before you state the research question.	
Identify and list the independent variable (this is the one you are changing, x) and dependent variable (the one that changes, y).	
Identify and list the controlled variables. These are all the other quantities that you could change but that are being kept constant.	
You will not be graded on writing a hypothesis but it is good practice to say what you expect to happen.	

Aspect 2: Controlling variables

List the apparatus used	
Draw a labelled diagram of the apparatus, a photo is also a good idea	
Describe how you are going to change and measure the independent variable	
Describe how you are going to measure the dependent variable.	
Describe what you did to make sure the controlled variables remained constant.	

Aspect 3: Developing a method for the collection of data

State the range of values of the independent variable that you are going to use	
State how many times you are going to repeat the measurements of the dependant variable	

LAB REPORT CHECKLIST – Data Collection & Processing

Aspect 1: Recording Raw Data

Draw a table (using Excel) with a column for each measurement. This will generally mean one column for the independent variable and 5 for the repeated measurements of the dependent. There should be at least 5 rows one for each time you change the independent variable.	
If your data is coming from the gradient of a "data logger graph" or other graphic computer display include an example of this graph in you report.	
The number of decimal places should be the same for all values in a column	
Each column must have a heading and the units of the quantity	
If you have estimated the uncertainty of the measuring instrument this must be in the header. If you are going to calculate the uncertainty from the max and min values then you don't have to include it yet.	
Uncertainties should be rounded of to 1 significant figure ±0.2 not ±0.17	
The number of decimal places in the data should not exceed the limit of the uncertainty. e.g. if uncertainty is ±0.2 the measurement should only be quoted to 1 decimal place	
Comment on how you arrived at any uncertainty value in the table	
Comment on any observations you made that might be relevant later; there might not be anything here.	

Aspect 2: Processing Raw Data

The data should be processed in some way, for example averaging, squaring or finding the sine. Processed data should be displayed in a table separate to the raw data table.	
The table must have headers that include units and uncertainties	
Calculate uncertainties in the repeated measurements by finding the 1/2(max value – min value) in the spread of data.	

Alternatively, use the standard deviation as the uncertainty in the repeated measurement.	
Calculate the uncertainties in processed data. Any calculation must be explained at least once	
The number of decimal places in each column must be consistent with each other and the uncertainty.	

Aspect 3: Presenting Processed Data

Processed data should be presented in a graph. This graph should ideally be linearised if possible. The graph should be drawn using Graphical Analysis (ideally).	
The graph must have heading, axis labels and units.	
Independent variable should be on the x-axis, Dependent variable should be on the y-axis	
The graph must include error bars	
A best fit line should be plotted automatically	
The equation of the line must be displayed ($y = mx + c$).	
Manually fit the steepest and least steep lines that fit the error bars	

LAB REPORT CHECKLIST – Conclusion & Evaluation

Aspect 1: Conclusion

State whether your graph supports the theory. E.g. Is the relationship between the quantities linear? This is only true if the line touches all error bars, don't say it is if it isn't.	
Are there any points on the graph that appear to be due to mistake (outliers), maybe it's best to remove these and plot the line again?	
Normally the data will be arranged so that the gradient will give you some value. Calculate this value from the gradient.	
Calculate the uncertainty in this value from the steepest and least steep lines.	
Compare your result with an accepted value, say where this value is from and quote uncertainty if known. Don't forget units.	

Aspect 2: Evaluation

This is where you say if the conclusion is reasonable or not, you must have evidence for anything you write here, this can be from your results (the graph) or the observations you made during the experiment. You shouldn't say friction was a problem without evidence. It might help to do a small experiment to show that something was a problem. *Comments do not have to be negative.*	
Comment on whether your graph shows a trend; is it clearly a curve even though the line passes through the error bars? Are the errors reasonable, are they obviously too big or too small	
Comment on whether the intercept tell you anything, if it is supposed to be (0,0) and isn't it might suggest a systematic error.	
Comment on whether you manage to keep the "controlled variables" constant?	
Comment on the equipment used and the method in which you used it.	
Comment on the range of values and the number of repetitions. Comment on time management	

Aspect 3: Improving the Investigation

List ways of improving the investigation (I.e. reducing the uncertainties). Anything you write here must be related to something you mentioned in the evaluation. This in turn should be linked to the results. *Think like a detective, look for evidence.*	
If possible do a calculation or a small experiment to show how the improvement might improve the accuracy of the result.	
If you had a more reading (wider range or more repetitions) would it improve your result?	
Is there any modification to the apparatus or to the original method that would make the results better?	